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## Microbes and humans: the long dance

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In a world where the determinants of health and the transfer of health risks are globally interdependent, infectious diseases constitute a global threat that puts every nation and every person at risk. History has amply demonstrated that communicable diseases are inescapably relevant to humankind, advances in modern science notwithstanding. This timeless dance between humans and microbes began in the distant past and will continue well into the future.

As global health challenges reveal our interdependence, they demand collective consensus and action. International public health legislation provides an important tool to achieve shared goals. In 2005, the World Health Assembly approved profound revisions of the 1969 International Health Regulations (IHR) that create a new multilateral legal framework for global disease surveillance, notification and response.<sup>1</sup> The revised IHR move away from a historical, and often stigmatizing, disease-specific system of notification to require reporting of all public health emergencies of international concern, including events or hazards from communicable diseases, biological, radionuclear and chemical agents. Further, a fundamental change in surveillance practices to include the use of information other than official state notifications allows for a more sensitive and proactive system of detecting events and outbreaks.

The revised regulations officially come into force on 15 June 2007. Their successful implementation requires not only national investments in public health capacity but a shared global commitment to transparency and compliance in reporting health-related events. The trans-boundary spread of public health emergencies is best addressed through multilateral cooperative efforts. The control of the SARS outbreak in 2003 was as much a testament to global solidarity in outbreak containment as it

was a validation of the merits of openness in disease reporting, collaborative international action and enlightened risk communication.<sup>2</sup>

Health as a global public good cannot be achieved through national policy action alone, but relies on international cooperation.<sup>3</sup> A good example is the need for free and open sharing of novel influenza viruses for both risk assessment and vaccine development. Equally important is the need to ensure that all countries benefit from the public goods, such as vaccines and diagnostic tests that result from this sharing. Such international commitment to finding global solutions to shared threats will be critical. Public health's relevance today goes beyond countries' domestic agendas, as it also holds important strategic and foreign policy considerations, and implications for economic development and national security.<sup>4</sup>

Although emerging infectious diseases afflict all nations, their impacts on developed and developing countries may be different.<sup>5</sup> A disproportionate burden of human suffering and death from infectious diseases occurs in developing countries due to inequitable access to and distribution of vaccines, medicines and resources needed to prevent, treat and control infectious diseases. New diseases compound existing health burdens in developing countries and have broad negative consequences for livelihoods, economic development and health systems.

In developed countries, the corollaries of disease outbreaks and epidemics take on added dimensions. Given the needs for efficiency and productivity, modern systems of commerce and transport are vulnerable to disease-related shocks, and these essential services are also compromised by major epidemics.

The globalization of infectious diseases in many ways parallels global economic trade and human develop-

ment. Interacting environmental, economic, social and human behavioural factors drive new diseases' emergence.<sup>6</sup> Many new emerging diseases are thought to be zoonotic in origin, arising from perturbations in the animal-human interface secondary to such factors as expanded human activity and ecological disruption.<sup>7</sup>

Constant evolution is the survival mechanism of the microbial world, and these organisms are well equipped to exploit opportunities to adapt and spread. The opportunities are numerous: through increased population movements via tourism, migration or disasters; growth in international trade in food and biological products; social and environmental changes linked with urbanization, deforestation and alterations in climate; advancements in medical procedures; and changes in animal husbandry and food production methods.<sup>8</sup>

To meet the resurgence of infectious diseases as a global threat, new paradigms and actions are needed. Given that emerging diseases arise from the confluence of human and animal ecologies, greater cooperation between the human and veterinary health sectors is vital. Broader investments in national health systems are needed to achieve health benefits for a greater population threatened by endemic and emergent diseases.

The risk of emerging infections will not diminish with time: the long dance between humans and microbes will continue. It is therefore imperative that systems and resources for robust national and international public health responses be created and maintained. The revised International Health Regulations provide a framework under which this can occur. Their successful implementation will decrease our vulnerability and move us closer to the goal of international public health security. ■

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